BOARD OF PILOT COMMISSIONERS FOR THE BAYS OF SAN FRANCISCO, SAN PABLO, AND SUISUN

INCIDENT REVIEW COMMITTEE INVESTIGATION REPORT

REPORT OF THE INTERACTION BETWEEN THE M/V HYUNDAI NEPTUNE AND THE M/V THALASSA AVRA WHILE PASSING BERTH #37, AT THE PORT OF OAKLAND, ON MAY 21, 2020 PILOT: CAPTAIN DREW AUNE

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I. INTRODUCTION

1. On the morning of May 21, 2020, the M/V HYUNDAI NEPTUNE (hereinafter HYUNDAI NEPTUNE) was entering the Oakland Outer Harbor (OOH) in the Port of Oakland, bound for Berth 25, with Captain Aune conning.

2. The M/V THALASSA AVRA (hereinafter THALASSA AVRA) was alongside at Berth 37.

3. As the HYUNDAI NEPTUNE passed Berth 37 interaction between the vessels caused the THALASSA AVRA to surge, parting six mooring lines. The surge also rotated the ship enough to allow the bow of the THALASSA AVRA to contact the adjacent container gantry crane, damaging the crane.

4. Approximately 45-minutes later, the M/V HANOVER EXPRESS was inbound at OOH, and while passing Berth 37, the THALASSA AVRA suffered another headline parting.

5. There were no injuries to persons. None of the other ships moored in Oakland experienced any damage.

6. The Incident Review Committee consisted of Commissioner Jennifer Ferrera-Schmid as Chairman and Executive Director Allen Garfinkle. The IRC prepared this report pursuant to California Harbors and Navigation Code Section 1180.3 and Title 7, California Code of Regulations Section 210.

7. Abbreviations in the report refer to the following:

- **IRC** – Incident Review Committee
- **SFBP** – San Francisco Bar Pilots
- **OOH –** Oakland Outer Harbor
- **UKC –** Under keel clearance
- **USCG –** United States Coast Guard

II. FINDINGS OF FACTS

1. Vessel Identification and Description

HUNDAI NEPTUNE is a container ship registered in the United Kingdom. She was built in 2016.

Vessel Particulars:

Length: 1014 feet Beam: 157 feet
Average Draft: 42 feet deep
Tonnage: 110,632 gross tons
Propulsion: Diesel Engine
Owner: Zodiac Maritime
Operator: HMM Co., Ltd. (Hyundai Merchant Marine)

THALASSA AVRA is a container ship registered in Singapore. She was built in 2014.

Vessel Particulars:

Length: 1209 feet Beam: 167
Average Draft: 46 feet deep
Tonnage: 148667 gross tons
Propulsion: Diesel Engine
Owner: Thalassa Avra PTE Ltd., Athens, Greece
Operator: Enesel PTE Ltd., Athens, Greece

2. Date of vessel movement

Date and Time: May 21, 2020, approximately 0440 hours
Location: Port of Oakland, California

3. Identification of Pilots

San Francisco Bar Pilot (HYUNDAI NEPTUNE): Captain Drew Aune
San Francisco Bar Pilot (THALASSA AVRA): Captain David Corbett

4. Weather and Sea Conditions

A. Weather Conditions
The weather conditions in the Port of Oakland on May 21, 2020 were as follows:

a. Wind: W'ly at 10-14 knots
b. Visibility: good
c. Humidity: 76%
d. Temperature: 59º

B. Tidal Information

Calculated HYUNDAI NEPTUNE under keel clearance at Oakland, California:

a.	Controlling depth =	48’ 03”
b.	Height of tide at 0500 =	+ 0 00"
c.	Depth at 0500 =	48’ 03"
d.	Deep Draft	41 ’04”
e.	UKC at the time (0500)	6’ 11”

C. Current Information: Yerba Buena Island, 0.3 nmi. SE of

a. Maximum ebb current occurred at 0239 hours - 1.19 knots
b. Slack water occurred at 0637 hours
c. Current at time of event (0437 hours) ≈ 0.6 knots

5. Description of the Incident

A. On the morning of May 21, 2020, at approximately 0415 hours, Captain Drew Aune boarded the inbound HYUNDAI NEPTUNE off the city front. The ship was bound for Oakland, Berth 25.

B. After conducting a pilot to pilot information exchange, Captain Aune took the conn and proceeded toward Oakland via the D-E span of the San Francisco – Oakland Bay Bridge. The current at the Oakland Bar Channel was predicted to be ebbing at 1.0 knot. Captain Aune was aware that the THALASSA AVRA, a 1200 foot ship, was berthed portside to the berth at Oakland Berth 37.

C. There were three assist tugs assigned to the HYUNDAI NEPTUNE. Prior to passing under the Bay Bridge, the tug Z5 was secured to the center lead aft position. While passing under bridge the tug Z3 was secured on the starboard bow, and the tug Z4 was directed to stand by the starboard quarter with no line to assist turning and then make fast on the starboard quarter for berthing.

D. As the HYUNDAI NEPTUNE was entering the Oakland Outer Harbor, Captain Aune had ordered the Z3 and the Z5 to back their engines between half and three-quarters power. As they both passed the end of the Ben E. Nutter Terminal (colloquially referred to as PCT), the HYUNDAI NEPTUNE speed was 7.8 knots.

E. As the HYUNDAI NEPTUNE was passing the ship berthed at Oakland Berth 37, the THALASSA AVRA, the engines were stopped and two of the tugs were pulling astern at three-quarters power to bring down the speed. As the bow of the HYUNDAI NEPTUNE approached the bow of the THALASSA AVRA, Captain Aune’s Portable Piloting Unit (PPU), a laptop with navigation software, recorded a speed of 6.9 knots. By the time his stern was passing the stern of the THALASSA AVRA, his speed was down to 5.2 knots.

F. Captain Aune reported that, as his bridge passed the stern of the THALASSA AVRA, through the open bridge wing door he heard two very loud bangs. He glanced at the radar and noted that his speed was 6.2 knots. Soon after the noise, the tug Z3 called on the VHF radio and reported that some lines had parted on the berthed vessel. Captain Aune released the Z4 to stand by the THALASSA AVRA and assist if necessary.

G. The THALASSA AVRA had six of their sixteen mooring lines part, four headlines and two after spring lines. The interaction also caused the THALASSA AVRA to rotate counterclockwise at the dock which brought the bow in contact with the adjacent gantry crane.

H. There were no injuries as a result of the interaction. The HYUNDAI NEPTUNE proceeded to her berth and moored with no further issues.

I. Approximately 45-minutes later, the HANOVER EXPRESS passed the THALASSA AVRA at 3.2 knots with now retired pilot, Captain Livingstone at the conn. In spite of the lower speed, and three tugs pushing on the THALASSA AVRA, a single headline parted. The IRC determined, with respect to the HANOVER EXPRESS and the single parted headline, that there was clearly no pilot error and discontinued the investigation.

6, Statements of Witnesses

A. Statement of the Pilot on the HYUNDAI NEPTUNE

a. He boarded the vessel via launch off Fort Mason at approximately 0415. Following the pilot (information) exchange, he took the conn and proceeded to Oakland 25 via D/E span (of the San Francisco-Oakland Bay Bridge).

b. He stated the ship was drawing 41.3 feet, there was an ebb current at the Oakland Bar Channel predicted at one knot, low tidal condition of 0.00 feet, UKC of 6.5 feet for the Oakland transit, three assist tugs assigned and a 1200 foot vessel berthed port side to at Oakland 35/37.

c. Prior to (passing under the San Francisco-Oakland Bay Bridge) D/E span, the tug Z5 was secured to the center lead aft, tug Z3 was secured on starboard bow, and tug Z4 was directed to stand by the starboard quarter with no line to assist with Matson Corner as needed, then to make fast on the starboard quarter after the turn.

d. During the Oakland Bar Channel transit, he used slow ahead and dead-slow ahead bells, except for a quick half-ahead bell near Buoy 2A for steerage. He stated that he did his normal ebb current approach, staying appropriately on the red side of the channel until final approach to PCT, where he put vessel directly on the centerline range.

e. Just prior to his bow entering PCT, he was using the Z3 and Z5 pulling alongside and straight back from half to three-quarters power.

f. As soon as he felt safely comfortable with steerage and prevailing current, he stopped the engine of the vessel and continued to use both tugs at three-quarters power to assist bringing down the speed.

g. The HYUNDAI NEPTUNE is a forward house ship. He stopped his engines when his bridge wing was abeam of PCT. His computer playback showed a speed, when bow to bow with the berthed vessel at Oakland 35/37, of 7.7 knots.

h. He stated that while passing the THALASSA AVRA he had his ship on “stop engines” with both tugs working three-quarters power (astern). His computer playback showed his speed at 6.9 knots when he was bow to stern and stern to bow (even alongside), 6.0 knots when his

bridge wind passed the stern, 5.7 knots when his quarter passed the stern, and 5.2 knots when stern to stern.

i. A few seconds after passing the stern of the berthed vessel, he heard two very loud bangs within seconds of each other. At that moment he glanced at the radar and saw that his speed was 6.2 knots. The Z3 reported by radio that some lines had parted on the THALASSA AVRA. He released the tug Z4 to stand-by the berth vessel and assist if necessary. He called San Francisco Vessel Traffic Service on his cell phone and informed them that some lines parted on the vessel berthed at Oakland 35/37.

j. The remainder of the job was uneventful.

B. Statement of the THALASSA AVRA master

a. Today, 21 May 2020, while vessel was secured port-side to at the Port of Oakland after completeing cargo operations, at 0436 (hours) she came into contact with a gantry crane due to a sudden surge caused by the incoming vessel HYUNDAI NEPTUNE.

b. At 0424 hours cargo operations ceased. At 0430 hours, the Duty Officer went to the bridge for the necessary departure preparations, where he observed the HYUNDAI NEPTUNE entering the port at high speed, and passing very close to the vessel. The Duty Officer instructed the AB's on deck to remain on stand-by.

c. At 0436 hours, the Duty Officer left the bridge in order to confirm the position of the vessel. It was discovered that the vessel had moved away from the berth due to the wash incurred by the HYUNDAI NEPTUNE.

d. On account of this movement, the vessel's forward, port side topside touched the gantry crane on the jetty while four headlines and two after-spring lines parted.

e. The terminal supervisor, local agent, and USCG were notified. The agent informed the master that the vessel would be departing on time.

C. Statement of the THALASSA AVRA Able Seaman Russell

a. At 0415 hours, he checked all mooring ropes at forward and after stations. Found all in good condition and tensioned adjusted properly.

b. At 0424 hours, vessel completed cargo operations and he joined AB Larry at gangway.

c. At 0430 hours Second Officer informed him of inbound vessel and requested he and AB Larry to stand by. AB Larry remained at the gangway and he proceeded to the aft station.

d. At 0436 hours the vessel started moving astern and off the dock, and at the same time he heard a few short snaps from the aft station.

e. At 0437 when he arrived at the aft station, two spring lines aft were discovered parted.

Statement of the THALASSA AVRA Able Seaman Larry

a. At 0424 hours AB Russell and AB Larry were on gangway watch. At 0430 hours, the Second Officer informed them that there was an inbound vessel and to stand by. AB Larry was to remain at the gangway while Ab Russell proceeded to aft station.

b. At 0436 hours, he heaved up the gangway to one meter above the jetty and stood by at the gangway controller. The vessel started moving astern and off the dock. He heard some scratching sound and two short snaps from the forward section.

c. At 0437 hours AB Russell reported by radio to Second Officer that two after spring lines had parted. The Duty Officer reported to the Chief Officer that 4 headlines parted and that the vessel had made contact with the shore crane.

D. Statement of the THALASSA AVRA Second Officer

a. At 0424 hours, completed cargo operations.

b. At 0430 hours he went to bridge for departure preparation and noticed inbound vessel HYUNDAI NEPTUNE at high speed passing very close to our vessel. Informed AB's Russell and Larry to stand by.

c. At 0436 hours, he went to the main deck and was informed by the AB's that the vessel was moving and at the same time he heard some scratching sounds and two short snaps from the forward station. The HYUNDAI NEPTUNE passing made our vessel move astern and outwards, causing four headlines and two after-spring lines to part. Vessel touched shore crane and received scratches and bent the hull topside.

8. Other Information

Mooring of the THALASSA AVRA

The THALASSA AVRA was moored portside to at Everport Terminal in Oakland Berth 35/37. At the outset, it is important to note that due to the timing of the departure of the THALASSA AVRA departure (within two hours of the event) no Commission investigator was able to attend the ship to assess and verify the mooring arrangements, and instead must rely on witness statements for mooring information.

The ship was moored with 16 mooring lines that were, according to the USCG report, certified and recently inspected as satisfactory in accordance with the ship's Integrated Management System. The USCG investigation contained a Germanischer Lloyd (GL)[1] "Certificate of Test and Examination of fibre ropes", dated April 3, 2014, testing 1 of 16 coils of polyamideline to a breaking load of 1312 kN. The investigation report also contained four mooring line "Certificate(s) of Conformity" for 4 coils of NikaSteel lines, dated April 13, 2018, and an inventory of "Mooring Ropes" from the ship detailing location on deck, size, breaking load, construction material, length, and certificate number. In that inventory, only one line is designated "Polymide Nylon", and five are designated Nikasteel.

[1] A classification society based in Hamburg, Germany, which later merged with Det Norske Veritas to become DNV GL

Of the four Certificate(s) of Conformity provided, only three are listed in the inventory (and one does not match the certificate description). It is not clear from the USCG investigation whether these certificates represented the mooring lines that parted during the event, as the locations on the inventory are only forward or aft (4 headlines and 2 after spring lines parted).

In the USCG 2692, Report of Marine Casualty form filed by the Master of the THALASSA AVRA, he states that three watch standers were on duty at the time of the event. It also states that cargo operations had concluded, but preparations for departure had not yet commenced. There was no evidence collected that indicated the condition of the mooring lines at the time of the incident, other than the statement of the Able Seaman Villanueva Russell stating that 0415 hours he checked all mooring lines at forward and aft stations and that all were in good condition and tension properly adjusted. We did find that the statements by the Able-Bodied Seamen Russell and Larry unusually consistent in both content and times, and both indicated that they sensed astern motion prior to the parting of the lines. This may be construed as evidence that there was some slack in the lines, allowing the ship to surge aft. We do not have evidence of whether the THALASSA AVRA had the mooring lines on winches with automatic tensioners, or whether they were on the brake or on mooring bitts.

Speed of the HYUNDAI NEPTUNE

In assessing any interaction, among the factors to consider are the speed of the passing vessel. The relationship is the higher the speed, the greater the interaction. To assess the speed of the HYUNDAI NEPTUNE we consulted information provided in the USCG written investigative report, the Vessel Traffic Service "Ports and Waterways Safety System" recreation, and the pilot's statement. The evidence is consistent in all three sources.

The evidence shows that as the HYUNDAI NEPTUNE approached the Oakland Outer Harbor their speed varied between 8.5 knots and 8.0 knots. As the ship approached the PCT, the speed was dropping as the pilot backed the tugs Z3 and Z5. In his statement, the pilot stated he was using slow ahead and dead-slow ahead bells (except for one quick half ahead bell near Buoy 2A, for steerage). As the ship's bow passed the end of PCT, the ship was at 8.0 knots. As the ship began to pass the THALASSA AVRA, the speed continued to slow, as the pilot had stopped the engine and continued to back the tugs. By the time the HYUNDAI NEPTUNE was stern to stern with the THALASSA AVRA the speed was down to 5.2 knots. When the sound of the lines parting was heard by the pilot aboard the HYUNDAI NEPTUNE, he stated that he looked at the radar and the speed was 6.2 knots.

Position of the HYUNDAI NEPTUNE

Another factor to consider when assessing interaction is the proximity of the passing vessel to the moored vessel. The relationship of proximity to interaction is the closer the passing ship is to the moored vessel, the greater the interaction. When assessing the position of the HYUNDAI NEPTUNE it is important to keep in mind the environmental forces in play as the ship approached Oakland Outer Harbor (OOH). With an ebb current, the approach to OOH is made favoring the south side of the channel. This is necessary because the cross current across the face of PCT pushing the ship to the north, is significant. Once the ship is close to entering OOH, it is then advisable to straighten up on the course for the OOH channel.

The OOH channel width is approximately 720 feet, and considering the 167 foot beam width of the THALASSA AVRA, the remaining channel available is 553 feet wide, of which the HYUNDAI

NEPTUNE used up another 189 feet (including the beam measurement of the tug Z3). This left an approximately 360-foot wide channel with which to maneuver in.

In addition, while not mentioned elsewhere, it appears in the VTS playback that there was an outbound vessel (perhaps a tug), in the OOH channel, approaching on the green side.

8. Estimate of Damages

The damage in this event was the parting of six mooring lines and subsequent contact by the ship's hull with a shoreside gantry crane. While we do not have the monetary value of the parted mooring lines, the damage to Everport's gantry crane resulted in $274,128.96 of repairs. Everport's total losses, including loss of use of the crane, were estimated to be $768,000.

9. Names of Witnesses

The written, oral, or reported statements of witnesses included are as follows:

Capt. Drew Aune	Pilot of the HYUNDAI NEPTUNE
Capt. Volodymyr Shkurak	Master of the THALASSA AVRA
Kourouvakalis Loannis	Second Officer on the THALASSA AVRA
Mutia Larry	Able Seaman on the THALASSA AVRA
Villanueva Russell	Able Seaman on the THALASSA AVRA

10. Nature and Extent of Injuries

None.

11. Relevant Records from U.S. Coast Guard (USCG)

On March 28, 2020, a Freedom of Information Act (FOIA) request was submitted to the USCG. On March 25, 2021, after not having received a response to the original FOIA request, another request was re-submitted. On July 8, 2021, the Board received a response to the FOIA request. This response is included in this report as Attachment 7. This response included an optical computer data disk with the VTS playback on it, which will be introduced as Exhibit 2.

12. Pilot Licensee Background Information

Captain Aune has been licensed by the State of California since April 1, 2008. Captain Aune was involved in one prior investigation involving the MSC KATIE, where he was supervising a trainee while docking in Oakland. In that case the damage was estimated to be under $1000.

13. Other relevant information

Technical Reports

Two technical reports of vessel hydrodynamic modeling and dynamic mooring analysis involving ultra large containerships (ULCS) were created by Coast & Harbor Engineering (CHE) for the Port of Oakland. Both of these reports were provided to the San Francisco Bar Pilots for review. CHE's analysis evaluated vessel

hydrodynamics and forces on berthed vessels, vessel motions and forces in mooring lines, bollards and fenders.

The first report, published in 2011, studied the potential mooring impacts resulting from passage of new ULCS's in the Middle Harbor (Berths 55/56 & Berths 60-63), and Outer Harbor (Berths 35/37). The vessels modeled in the study are the MSC BEATRICE, a 1200-foot-long, 167 foot wide containership drawing 45 feet (as the moving vessel) and the COSCO LONG BEACH, a 984 foot long, 140 foot wide containership drawing 47.6 feet. These ships are remarkably similar in size to the ships involved in this event, although here their roles are reversed, with the larger of the two ships moored. In the analysis scenarios, all were simulated with the ships inbound.

In the 2011 report, CHE concluded that "Hydrodynamic modeling results indicate that forces on berthed containerships are larger in the Outer Harbor at Berths 35/37 than in the Inner Harbor at Berths 55/56 and Berths 60-63, due to the higher passing speeds necessitated by cross-currents, and lower passing distances."[2] They went on to state that "Results for Berths 35/37 indicate that higher passing speeds and closer passing distances result in much larger forces than are present at other terminals. For all tested cases, forces in bollards and fenders are within limits; however, for worst-case condition, no margin of safety exists. For this case, vessel motions are outside safe operating guidelines provided by PIANC[3]; therefore, all operations should cease well before this passing vessel event and resume after vessel motions have ceased. Communications between the incoming ship and terminal operators should be established ahead of time and maintained throughout the duration of the passing event."[4]

For the 2015 report[5], CHE went into more detail with regard to ships passing at Berth 37. One vessel used in this study was larger than those modeled in the 2011 study, with the larger CMA CGM ZHENG HE, a 1309-foot-long, 177-foot-wide, containership, as the passing ship, used in conjunction with the COSCO LONG BEACH. A total of 19 simulations were run at Berth 37 in this study, with the passing distances between hulls varying from a low of 152 feet to a high of 429 feet, with the average being 331 feet. The speeds of the passing vessel in the study varied from a low of 2.8 knots to a high of 5.2 knots.[6]

The Passing Ship Mooring Analysis Summary stated that "However, for a portion of the simulations performs passing Berth 37, mooring safety may become compromised if unfavorable conditions exist at the time of arrival or departure. Those unfavorable conditions may increase loads on the berthed vessel, and include lower water levels, or heavily laden passing and berthed vessels. Other unfavorable conditions may exist on the dock, such as using many lines on a single bollard, insufficient pre-tension in the lines, or insufficient attention paid to shoreside connections (gangways, etc.)"[7]

It continues on to state that "In the future, when CMA CGM ZHENG HE arrives in the Outer Harbor and a vessel is present at Berth 37, tighter tidal current restrictions should likely be in place (0.5 knots flood maximum). Also, attention must be paid to the vessel at Berth 37, such as its loading condition, mooring arrangement, and line pre-tensioning, to ensure higher levels of mooring safety. Personnel at the dock

[2] Technical Report – Part 1 Vessel Hydrodynamics and Mooring Forces Study Ultra Large Containership Hydrodynamic Analysis, Port of Oakland, CA, page 1.
[3] PIANC, an acronym for "Permanent International Association of Navigation Congresses," is a global organization providing guidance and technical advice for waterborne transport infrastructure to ports, marinas, and waterways.
[4] Ibid, page 18
[5] Technical Report Ship Accommodation Study for CMA CGM ZHENG HE, Port of Oakland, CA
[6] Idid, page 21-22
[7] Ibid, page 31

should be made aware of the passing ship and it is recommended that operations cease for the period of time when the CMA CGM ZHENG HE is passing the dock."[8]

The conclusions of the CHE's 2015 report state that "Passing vessel mooring analysis results show that passing vessel speed and clear distance between hulls dictates the magnitude of loads and moments experienced by the berthed vessel."[9] They concluded that for Berths 55 and 60, mooring safety was maintained for all simulations, but specifically call out Berth 37 as an anomaly.

"However, at Berth 37, a portion of the simulations indicated unsafe mooring conditions. The results indicate that a minimum of 300 feet clear distance between the passing and berthed vessel hulls be maintained if the passing vessel speed reaches approximately 4 knots. Attention should be paid to operations at the Berth, where proper pre-tensioning of lines should be maintained to help reduce berthed vessel motions, and limiting mooring lines to two per bollard should be promoted to help spread bollard loads."[10]

SFBP Operational Guidelines

The San Francisco Bar Pilots promulgate Operational Guidelines to offer guidance to licensees, vessel operators and their agents, and to the Operations Pilot. These guidelines are revised from time to time as conditions or situations warrant. There is a section of the guidelines particular to OOH, which dictate tug requirements as well as providing a Draft/Current Matrix, using length, draft, inbound or outbound and current status as the factors. At the time of this event, the matrix (dated 9/13/2017) specified that a vessel with a length overall of between 1000 to 1115 feet, and a draft of between 40 feet and 43 feet, inbound on an ebb, would be restricted to operating when the ebb current was less than 2.0 knots. This event was within the operation guidelines. These operations guidelines changed on June 14, 2021 (possibly in response to this event), and the new guideline for entering OOH on a vessel between 1000 and 1115 feet, drawing up to 45 feet of draft and transiting inbound are now limited to an ebb current of 1.0 knots or less.

III. ANALYSIS AND CONCLUSION BY THE IRC

Analysis

As with other cases of hydraulic interaction that the Board has considered, the rule of law applicable to a passing vessel is well established. Ordinarily a ship passing piers or docks where other vessels are moored is obligated to proceed carefully and prudently so as to avoid creating unusual swells or suction which would damage craft properly moored or an installation along the shoreline. The moving vessel must take into consideration the reasonable effects to be anticipated from its speed and motion through the water and must take such precautions by way of reduction of speed or alteration of course as may be reasonably necessary to prevent such damage.[11]

Likewise, there is a well settled duty placed on the moored vessel and the facility it is moored to. Piers and docks along the shoreline are required to be kept in proper condition and vessels tied up there must be seaworthy and properly moored so as to resist ordinary and normal swells in narrow waters where heavy traffic may be anticipated. Some wash from passing vessels is bound to occur and must be anticipated and

[8] Ibid, page 31
[9] Idid, page 31
[10] Ibid, page 32
[11] Shell Pipeline Corporation v. M/T CYS ALLIANCE, 1982 AMC 389 (E.D. La. 1981)

guarded against. Only unusual swells or suction which cannot be reasonably anticipated furnish the basis for a claim.[12]

To further complicate matters, when a moored vessel can establish that wake or suction caused damage to a vessel, that it was properly moored to resist ordinary swell and suction normally to be anticipated, and that the swell or suction came from the passing vessel charged, the vessel so charged can exonerate itself from blame by a showing that they were proceeding in a "reasonable and cautious manner".[13]

And finally, there is some case law to suggest that if a pilot is acting reasonably and prudently under the circumstances, which can be construed to mean using the same level of skill commonly possessed by other local pilots, and using his best judgment, he should not be found in error even if damage occurs.[14]

The Board is not constrained to apply this case law when assessing whether there was pilot misconduct, but rather it serves as a guide for the purpose of analysis.

In consideration of these elements we have divided the analysis into four parts: Passage of the HYUNDAI NEPTUNE, mooring of the THALASSA AVRA, whether the HYUNDAI NEPTUNE was proceeding in a reasonable and cautious manner, and were Captain Aune's actions reasonable and prudent and made using his best judgment?

A. Passage of the HYUNDAI NEPTUNE

1. When deciding if the HYUNDAI NEPTUNE was proceeding carefully and prudently one needs to consider the overall circumstances surrounding the interaction. This would include where the vessel was positioned in the channel, the speed with which it was traveling, the maneuvering characteristics of the vessel, and any other influences that may affect the handling of the vessel, such as strong current.

2. The HYUNDAI NEPTUNE pilot, Captain Aune, stated that they were passing the THALASSA AVRA while reducing speed (from when they entered OOH at approximately 8 knots to when they passed clear of the THALASSA AVRA traveling at approximately 5.2 knots). Captain Aune stated that he felt this speed was necessary to control the HYUNDAI NEPTUNE during his encounter with an ebb current at the Oakland Bar and across the face of PCT. He stated that as soon as he felt comfortable with the steerage and prevailing current, he stopped the engines and continued to have two of the three tugs backing at ¾ power.

3. The positioning of the HYUNDAI NEPTUNE was restricted by both the maneuvers necessary to counter the ebb current and the width of the channel. Captain Aune stated that he favored the "red side" until his final approach, then came left to the "center line range" when passing Berths 35/37.

4. The USCG, in their report on this event, concluded that the speed was necessary due to strong current present.

[12] Shell Pipeline Corporation v. M/T CYS ALLIANCE, 1982 AMC 389 (E.D. La. 1981)
[13] Shell Pipeline Corporation v. M/T CYS ALLIANCE, 1982 AMC 389 (E.D. La. 1981)
[14] Wilson v. Charleston Pilot Association, 57 F. 227, 231 (E.D. S. Carolina 1893)

5. Captain Aune was utilizing two tugs to assist in the control of the HYUNDAI NEPTUNE. A third tug was assigned to the job and was available. Had this third tug, the Z4, been utilized it may have allowed the ship to remain under control at a lower speed.

6. The case law further defines what "carefully and prudently" means in this context, adding that "The moving vessel must take into consideration the reasonable effects to be anticipated from its speed and motion through the water and must take such precautions by way of reduction of speed or alteration of course as may be reasonably necessary to prevent such damage." While we believe that Captain Aune was proceeding carefully for the ship he was piloting e.g. higher speed to control the HYUNDAI NEPTUNE, it appeared to prioritize the safe passage of his ship over taking into consideration the reasonable effects to be anticipated from his speed and motion.

B. Mooring of the THALASSA AVRA

1. We noted that relevant case law states that moored vessels must be seaworthy and properly moored so as to resist ordinary and normal swells in narrow waters where heavy traffic may be anticipated. Some wash from passing vessels is bound to occur and must be anticipated and guarded against. Only unusual swells or suction which cannot be reasonably anticipated furnish the basis for a claim. When evaluating the seaworthiness and proper mooring of a vessel we need to examine the equipment and lines utilized in the mooring, how these lines were tended, and whether the suction was unusual and could not have been anticipated.

2. The THALASSA AVRA was moored with sixteen mooring lines that appeared to meet the regulatory threshold for appropriateness and condition.

3. The THALASSA AVRA had completed cargo operations and was soon to depart, although the departure crew was not on deck at the time of the interaction event. One able seaman was making deck rounds and he stated that at 0415 hours he "checked all mooring ropes at Fwd and Aft stations – all were in good condition and tension properly adjusted." While on the face of this statement, we would tend to end the mooring line inquiry, but a question remains about the line tensioning, as we know that the phrase "tension properly adjusted" can indicate a wide range of tension, depending on the circumstances. We also note that the Able Seamen and Second Officer all note movement prior to the parting of lines, which may indicate some slack in the lines. We suspect lesser scrutiny was given to the tension of the lines, given that the rounds were preformed by one person who is anticipating departure relatively soon. Unless all the lines were on winches, adjusting the tension would take more than one person, but we lack this depth of information on the mooring arrangement.

4. The analysis also provides that only unusual swells or suction which cannot be reasonably anticipated furnish the basis for a claim. Given the size and draft of the HYUNDAI NEPTUNE, its relatively high rate of speed, it very well might be considered an unusual suction.

5. Our analysis of the duty to be moored properly does not end with the vessel. We also must look to the facility where it is moored and assess whether the piers and docks along the shoreline are kept in proper condition. In this case, the THALASSA AVRA made contact with the shoreside gantry, which was the source of the majority of damage. We know from the evidence that when the THALASSA AVRA was moving due to the interaction, it rotated some and allowed the bow to contact the gantry.

6. The contact of the ship with the gantry crane raised questions about the placement of the gantry crane on the dock. In this case, following cargo operations, it appeared the gantry crane was left adjacent to the bow of the moored ship. When the IRC inquired of Everport Terminal Services (ETS) as part of a Investigative Subpoena, as to whether they had any written policy or provided any written guidance on the placement of gantries when not in use, they responded that they had none. In the verbal response to the subpoena, Michael Andrews, the Terminal Manager responded that the gantries are placed by the longshoremen at the end of cargo operations without any intervention by the terminal management. This policy leaves the placement of the gantries at the end of cargo operations to the convenience of the individual longshore gantry operators. While anecdotal in nature, it is the experience of our investigators that when gantries are placed toward the mid-section of a vessel upon arrivals and departures, the possibility of damage during the mooring and unmooring of ships is lessened. It is likely, though speculative, that if ETS had such a policy in place at the time of the passing of the HYUNDAI NEPTUNE, it may have mitigated the impact of the interaction in question, and the damage incurred might have been limited to parted mooring lines.

C. Was the HYUNDAI NEPTUNE proceeding in a reasonable and cautious manner?

1. Even if it was established that wake or suction caused damage to a vessel, and that it was properly moored to resist ordinary swell and suction normally to be anticipated, and that the swell or suction came from the passing vessel charged, the vessel so charged can exonerate itself from blame by a showing that they were proceeding in a reasonable and cautious manner.

2. What is reasonable should be determined in light of the particular circumstance of the case, and reasonableness should be based on what a pilot of similar skill and experience would do. In this case Captain Aune stated that he held his speed to control the HYUNDAI NEPTUNE as he entered OOH. This is a reasonable reason to retain speed, particularly in an area known to be difficult to maneuver.

3. Likewise, whether Captain Aune was proceeding in a cautious manner should be framed by the circumstances of the case. Here the speed of the HYUNDAI NEPTUNE was being controlled by a low engine speed and two tugs backing. It can be argued that Captain Aune was proceeding cautiously, but with regard to maintaining control of the HYUNDAI NEPTUNE and less so for the moored vessel. It might have been prudent to have utilized the third tug so that control could have been obtained at a lesser speed.

D. Were Captain Aune's actions reasonable and prudent, and made using their best judgment?

1. There is case law to suggest that if a pilot is acting reasonably, prudently, and using his best judgment, that he should not be found in error even if damage did occur.[15]

2. Damage was suffered by the THALASSA AVRA, in the form of parted lines and subsequently hull contact with the gantry on the pier, due to the interaction.

3. We have discussed that, given the technically challenging entry into OOH with a strong current, having some speed to control the vessel is reasonable. Prudence, being a bit more abstract of a concept, is defined as "careful good judgment that allows someone to avoid danger or risks"[16] We believe that, in the situation he was faced with, i.e. entering OOH on an ebb with a large ship and a

[15] Wilson v. Charleston Pilot Association, 57 F. 227, 231 (E.D. S. Carolina 1893).
[16] Merriam-Webster online dictionary.

larger ship moored close by, Captain Aune was being prudent and using his best judgment, believing that by dropping his speed quickly he could avoid the worse impacts of the interaction that was pending.

Conclusion

In conclusion, we should first consider whether the HYUNDAI NEPTUNE was proceeding carefully and prudently. This requires a look at what factors contribute to hydraulic interaction. The major elements of hydraulic interaction are vessel speed, depth of water, and proximity to the moored object.

Of these three items, depth of water is not under the control of the pilot and proximity to the moored object is limited by the width of the channel. In this case Captain Aune felt he needed to be on the "red side" to counter the ebb current until he could swing left to the centerline range as he cleared the face of PCT. While he ended up in the center of the available water, the channel is fairly narrow, not allowing much, if any room to open the distance to the moored ship. This leaves speed through the water as the remaining variable under Captain Aune's control.

A review of the evidence shows that Captain Aune was traveling 7.7 knots when he was bow to bow with the THALASSA AVRA, and brought the speed down to 5.2 knots by the time he was passing stern to stern. We know that he had placed a tug on the stern and on the starboard bow and was using these tugs to control his speed. While speed was the only factor Captain Aune could control, it appears that in his efforts to control his ship, he was not able to reduce speed enough to avoid creating unusual swells or suction which would damage craft properly moored along the shoreline.

Even if we conclude that Captain Aune was not being careful and prudent to avoid creating an unusual swell or suction by continuing by the THALASSA AVRA at between 7.7 and 5.2 knots, that is only one element in the analysis. We must then ask the question - was the THALASSA AVRA properly moored?

As noted earlier, there is a duty placed on the moored vessel to resist ordinary and normal swells in narrow waters where heavy traffic may be anticipated. Since a Commission Investigator was not able to confirm the mooring arrangement, we relied heavily on the USCG investigation and witness statements. On the face of the evidence, it appears that the THALASSA AVRA generally met its burden of proper mooring. It had 16 mooring lines deployed and while their proper tensioning could not be confirmed, we have the statement of an Able Seaman aboard who said he had recently checked the tension and it was proper, although we view this statement with some skepticism, for reasons noted earlier. We also have evidence that the gantry crane was placed in a venerable position on the pier. Given the sheer of many containership bows, this venerable positioning puts the gantry at risk even during routine docking and undocking, and this practice should be evaluated by ETS, to prevent future damage.

If we decide that the THALASSA AVRA was moored properly, we move on to the question of was the passage of the HYUNDAI NEPTUNE reasonable and cautious? This Committee has always been troubled by assessing what is reasonable and cautious, particularly when considering vessel speed. Considering the width and depth of the channel is fixed, the only variable under the control of Captain Aune was the speed of the HYUNDAI NEPTUNE. There is a desire among ship handlers to maintain good headway as it allows better control the ship. It is a delicate balance between retaining enough speed to control one's own ship and slowing enough to avoid interaction with other ships, particularly in a narrow channel. To evaluate the standard of reasonableness we look to what a similarly situated expert would do in each instance. While it is easy to decide in hindsight that a slower speed would have been prudent, it is very difficult for the trier of fact to place themselves in the shoes of the pilot. Alas, considering that Captain Aune might have been able

to proceed at a slower speed and still retained the necessary control had he utilized his third tug, in the balance we find that while his speed was reasonable, it prioritized control over the vessel he was piloting over the speculative risk of interaction with the THALASSA AVRA, and therefore failed the cautiousness test.

And finally, even if we find that Captain Aune did not take all the precautions reasonably necessary to prevent interaction damage, and find that the THALASSA AVRA was properly moored so as to resist ordinary and normal swells where traffic may be anticipated, and find that the HYUNDAI NEPTUNE was not proceeding in a reasonable but not cautious manner, we then look to whether the pilot involved was using his best judgment. If so, then we should not find for misconduct, even if damage occurs. These four prongs of analysis provide a high bar to cross to find misconduct on the part of either pilot, even if damage did result. We find that Captain Aune was using his best judgment on this occasion, doing his best to prevent damage to his own ship while attempting to ameliorate the effects of his speed on the moored vessel.

Earlier we noted that the SFBP Operations Guidelines have been modified to address similar situations to this event and this is laudable. It is worthy to note that this set of facts is allowable under both the earlier and the revised guidelines.

We also consider the Vessel Hydrodynamics and Mooring Forces Studies conducted by Coast and Harbor Engineering for the Port of Oakland. Both the 2011 and 2015 studies flag Berth 35/37 as high-risk locations where "higher passing speeds and closer passing distances result in much larger forces than are present at other terminals" and that "for worst-case condition no margin of safety exists." (It is worthy of note that the highest speed used in these studies was 5.2 knots, which is the lowest speed reached by Captain Aune when passing the THALASSA AVRA.) These studies should serve to provide licensees with a basis for heightened awareness when passing this berth.

In addition, both studies contain the recommendation that "Personnel at the dock should be made aware of the passing ship and it is recommended that operations cease for the period of time when the (inbound ship) is passing the dock." Currently SFBP has no mechanism in place for notifying personnel at the dock or notifying a ship moored at this berth. We recommend that SFBP work with ETS to develop a communication mechanism that will provide for notification of ships passing this location. While an argument has been made that this is a challenging task, utilizing the ship's agent, information generally in the possession of the dispatcher, might provide a convenient tool for such notice. Tasking the dispatcher with this task would also free the pilot from the distraction of providing notice while engaged in the task of piloting.

Finally, it is not clear to the extent that these studies conducted by Coast and Harbor Engineering have been made regularly available to licensees and we recommend that a mechanism be developed so that licensees will be aware of this vital information.

IV. IRC RECOMMENDATIONS TO THE BOARD

Based on the above analysis and conclusions the IRC recommends:

1. That the Board find for no misconduct by Captain Aune in this case.

2. That SFBP work with Everport Terminal Services and the individual ships (through their agents) moored at Berths 35/37 to provide notification of when to expect passing vessels.

3. That SFBP develop a mechanism to disseminate the information contained in the Coast and Harbor Engineering Studies to their membership.

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Jennifer Ferrera Schmid, Chairman Allen Garfinkle, Executive Director

List of Attachments (one page each unless otherwise indicated):

Attachment 1 – Initial Incident Report from the Port Agent dated May 26, 2020.
Attachment 2 – Initial FOIA request to the USCG and USCG acknowledgment (2 pages).
Attachment 3 – USCG Report of Marine Casualty CG-2692 (3 pages).
Attachment 4 – Equipment/Property Damage Incident Form from ETS (2 pages).
Attachment 5 – Witness statements and Letter of Protest from THALASSA AVRA personnel (5 pages).
Attachment 6 – Email communication with ETS and their attorney, John Cox on damages (3 pages)
Attachment 7 – Response by USCG to FOIA request (44 pages).
Attachment 8 – Statement by the pilot on the HYUNDAI NEPTUNE (3 pages) (CONFIDENTIAL).
Attachment 9 – Investigative Subpoena by the IRC to ETS, dated July 27, 2021 (2 pages).
Attachment 10 – Investigative Subpoena by the IRC to ETS, dated September2, 2021 (2 pages).
Attachment 11 – Excerpt from SFBP Operations Guidelines dated 9/13/2017.
Attachment 12 – Statement by pilot on the THALASSA AVRA (CONFIDENTIAL).
Attachment 13 – SFBP Operations Guidelines dated June 14, 2021 (27 pages).

Exhibit one – this report
Exhibit two – the VTS playback recording of the passage
Exhibit three – Technical Report, Ultra Large Containership Hydrodynamic Analysis, Port of Oakland, 2011.
Exhibit four – Technical Report, Ship accommodation Study for CMA CGM ZHENG HE, Port of Oakland, 2015